Instructions

XC Impulse Lubricators

3A0416C

EN

Uses an external power impulse to control the discharge of grease or oil lubrication to all lubrication points of sliding- and roller bearings, drive- and transport chains, sliding guideways, open gears and seals. For professional use only.

Not approved for use in European explosive atmospheres.

75 psi (0.5 MPa, 5 bar) Maximum Working Pressure

Important Safety Instructions
Read all warnings and instructions in this manual. Save these instructions.

See page 4 for model information.

PROVEN QUALITY. LEADING TECHNOLOGY.

Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

⚠WARNING

ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment.
- Connect only to grounded power source.
- All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

FIRE AND EXPLOSION HAZARD

When flammable fluids are present in the work area, such as gasoline and windshield wiper fluid, be aware that flammable fumes can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources, such as cigarettes and portable electric lamps.
- Keep work area free of debris, including rags and spilled or open containers of solvent and gasoline.
- Do not plug or unplug power cords or turn lights on or off when flammable fumes are present.
- Ground all equipment in the work area.
- Use only grounded hoses.
- If there is static sparking or you feel a shock, **stop operation immediately.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

⚠WARNING

PRESSURIZED EQUIPMENT HAZARD

Fluid from the equipment, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.

- Follow the **Pressure Relief Procedure** before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See **Technical Data** in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment.
- Do not puncture, open or take lubricator apart.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

⚠WARNING

PERSONAL PROTECTIVE EQUIPMENT

You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

CALIFORNIA PROPOSITION 65

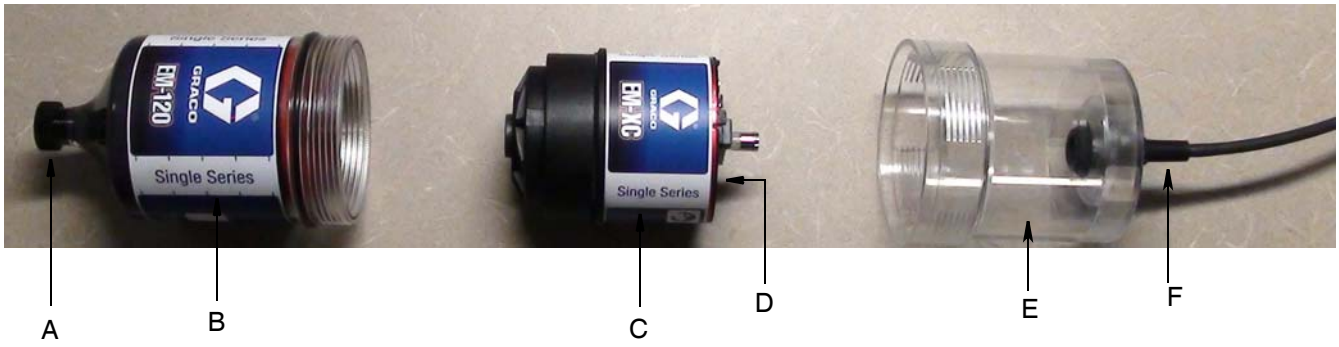
This product contains a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. Wash hands after handling.

Models

Part No.	Volume Output	Application
24E090	120CC	Bearing
24E089	120CC	Construction
24E092	120CC	Food Grade H1
24E091	120CC	Milling
24E095	120CC	Lithium EP1
24E088	120CC	Lithium EP2
24E093	120CC	Synthetic Industrial
24E094	120CC	Ultra Spindle
24E098	250CC	Bearing
24E097	250CC	Construction
24E100	250CC	Food Grade H1
24E099	250CC	Milling

Part No.	Volume Output	Application
24E103	250CC	Lithium EP1
24E096	250CC	Lithium EP2
24E101	250CC	Synthetic Industrial
24E102	250CC	Ultra Spindle
24E082	60CC	Bearing
24E081	60CC	Construction
24E084	60CC	Food Grade H1
24E083	60CC	Milling
24E087	60CC	Lithium EP1
24E080	60CC	Lithium EP2
24E085	60CC	Synthetic Industrial
24E086	60CC	Ultra Spindle

Component Identification



A Plug

B Lubrication Canister
NOTE: Canister cannot be refilled.

C † Drive Unit (Includes gear motor and circuit board)

D LED function display

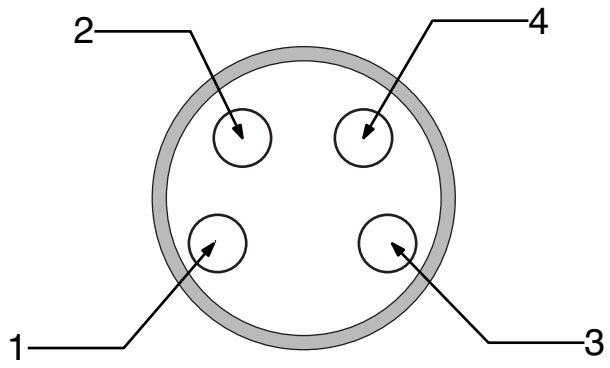
E † Cover

F † Cable with plug

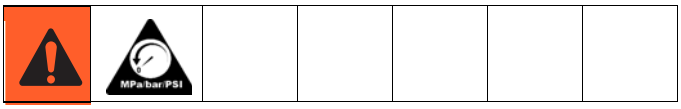
† Reusable parts

Pin Assignment

Pin Assignment	Cable Color	Signal
1	brown	current +
2	white	LED green digital
3	blue	current -
4	black	LED red digital

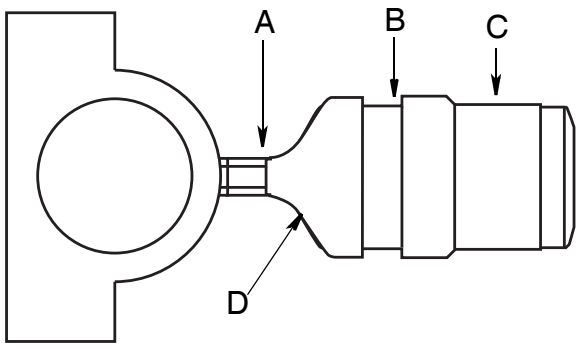


Pressure Relief Procedure



1. Cover lubrication point (A) and lubricator (B) with a heavy rag to absorb any fluid that may leak out while loosening the adapter.

2. Carefully unscrew support adapter (D) from the lubrication point (A).



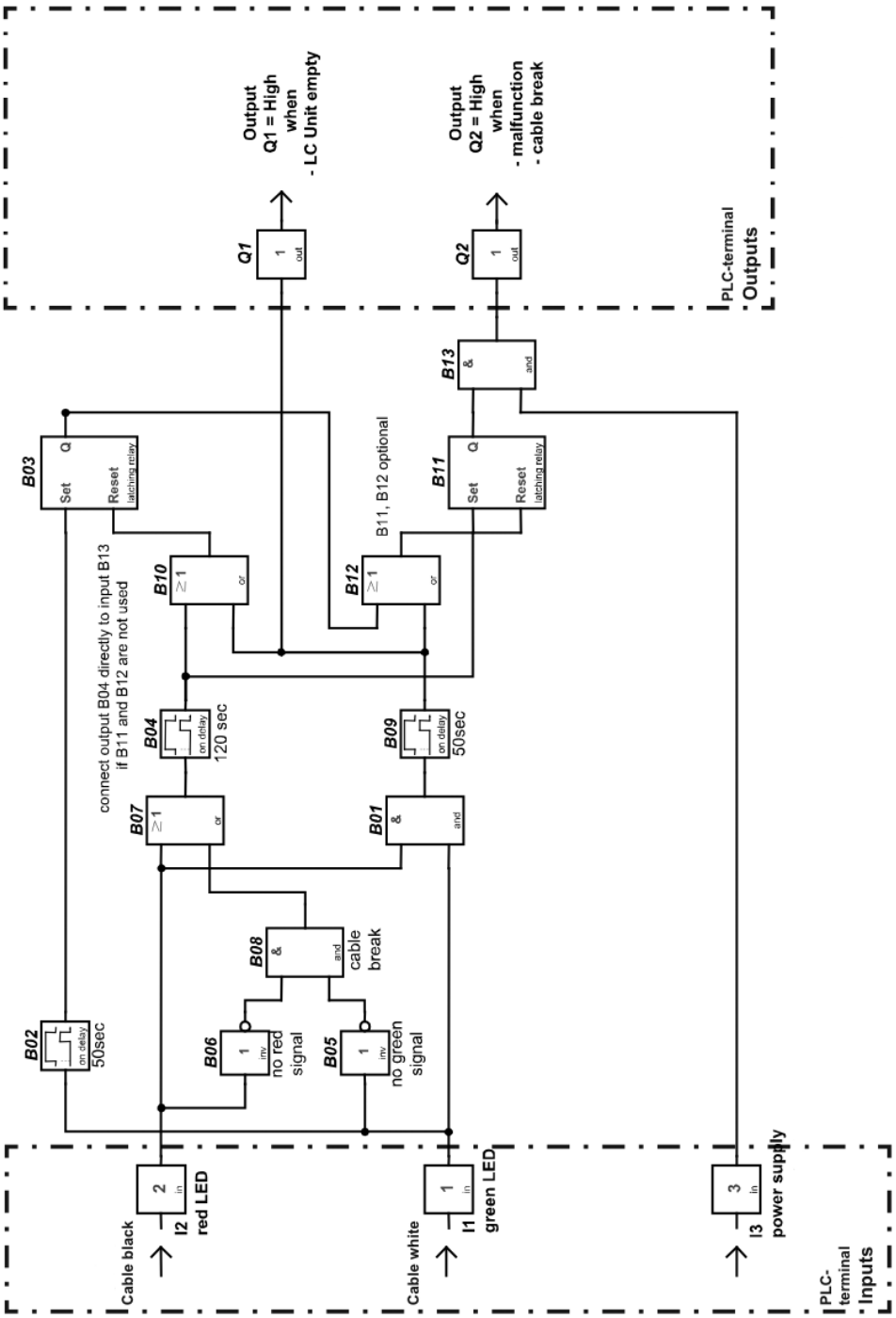
A Lubrication Point
B Lubrication Canister
C Drive Unit
D Support Adapter

Wiring Diagrams

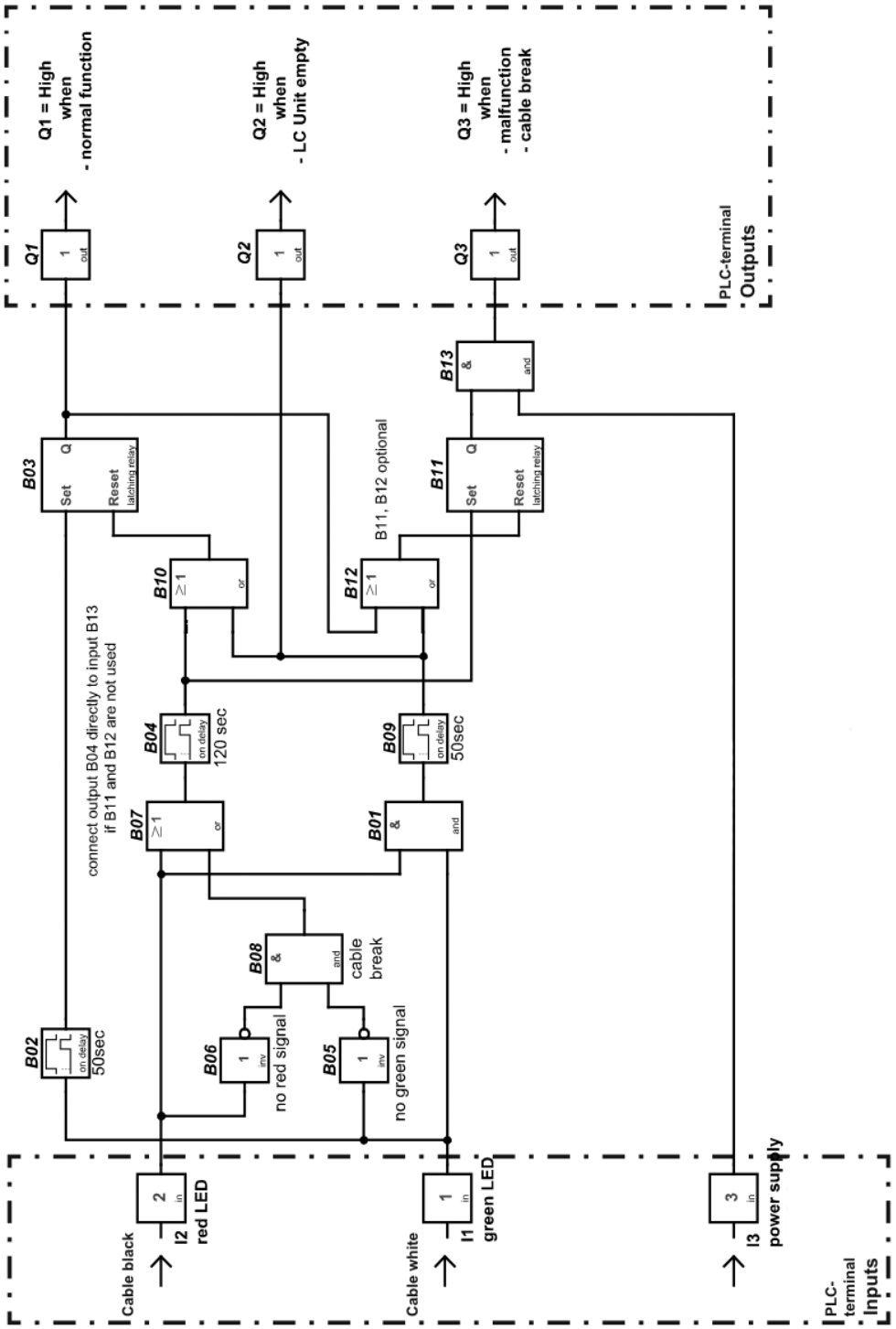
NOTICE

Incorrect connection of the lubrication unit could destroy electronics.

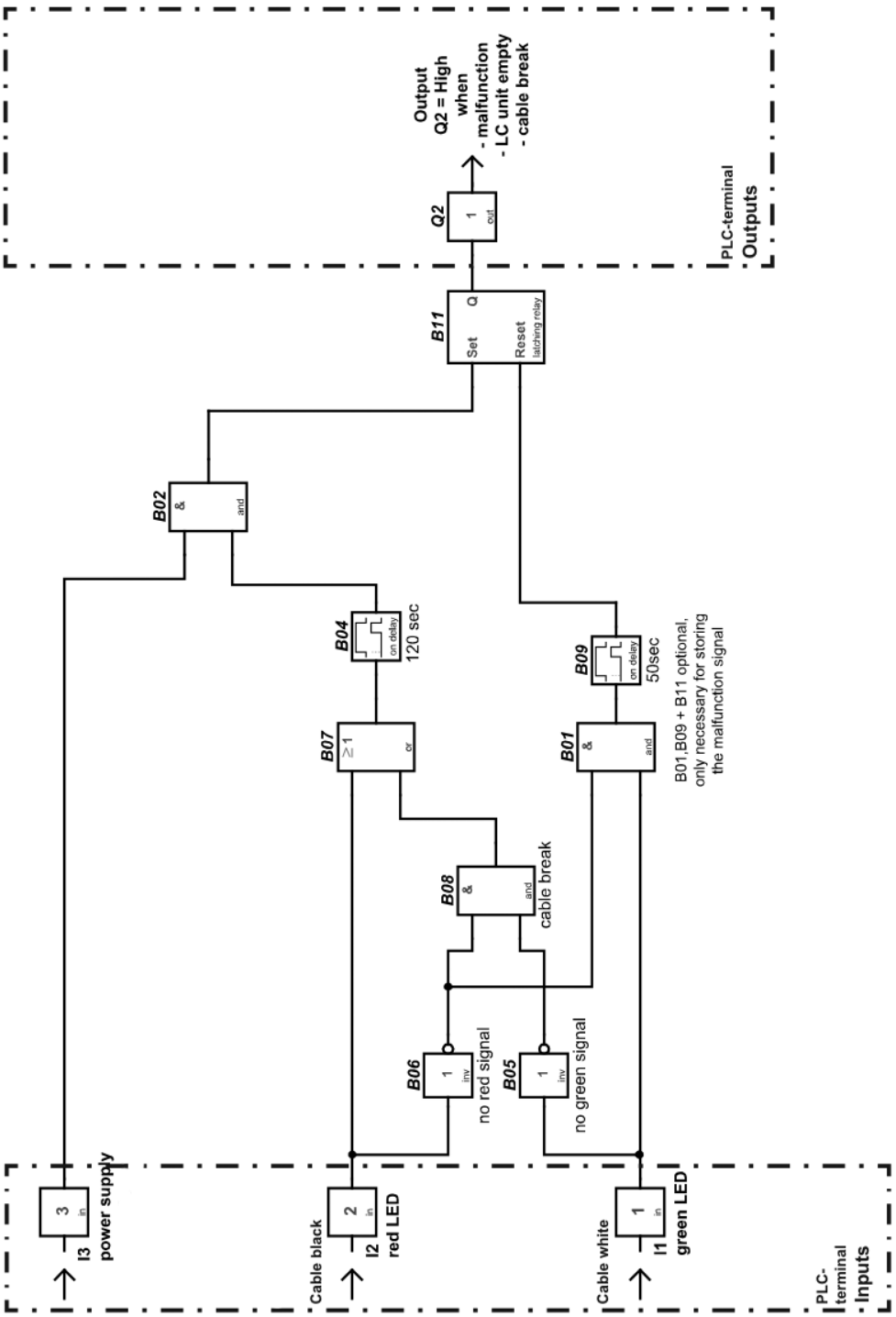
PLC Connection - One Output Signal



PLC Connection - Two Output Signals



PLC Connection - Three Output Signals



Installation and Setup

Determining Correct Mounting Method

NOTE:

- Direct mounting should be used for lubrication points that are easily accessible.
- Remote mounting is recommended if you answer **YES** to any of the questions below.

1. Is the ambient temperature at the lubrication point higher than +50°C (122°F)?
2. Is it necessary to remove protective screens, walls or other types of protection in order to reach the lubrication point?
3. Is the lubrication point exposed to high vibrations?
4. Is it difficult to access the lubrication point during operation of the machine?
5. Is the lubrication point exposed to any of the following:
   - water jets for high-pressure cleaning machines?
   - corrosive chemicals?
   - extreme temperature?
   - falling materials?

Preparing Lubricator for Installation

The lubricator has a self-protection mechanism which shuts off the drive unit at counter pressures higher than 5 bar (72.5 psi). Most bearings require 0.5 - 2 bar (7.2 to 29 psi) pressure (without tubes, extensions, angles, etc.).

Use the following procedure to check the counter pressure of the application prior to installation.

NOTE:

- Be sure to use a lubricant cartridge that contains the same grease used in the application.
- The best measurement results are achieved during operation.

Checking the Counter Pressure

1. Clean the lubrication point to remove any potential contaminants.
2. Install reducers, extensions, grease line, etc. (if necessary).
3. Prime the grease line and all accessories with the same grease that is contained in the lubricator. (See Parts, page 22 for a complete list of available grease cartridges).
4. Remove the plug (A).

5. Install lubricator unit into adapter (B).

6. Screw a pressure manometer into the lubrication point *(dd)* (FIG. 1, page 11).

A pressure manometer is a simple device that measures pressure output. To build a pressure manometer you need a pressure gage (*aa*), tee fitting (*bb*) and stop valve (*cc*). FIG. 1 shows a correctly assembled pressure manometer, connected to the lubricator and a lubrication point.

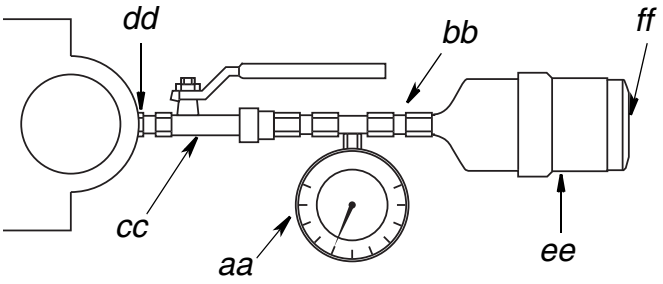
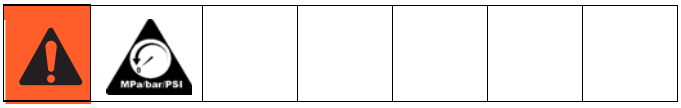


FIG. 1

aa	*Pressure Gauge*
bb	*Tee Fitting*
cc	*Stop Valve*
dd	*Lube Point*
ee	*Lubricator*
ff	*ON / OFF Switch*

7. Ensure the stop valve (*cc*) of the pressure manometer is open.
8. Attach lubricator and adapter (B) to the pressure manometer (*aa* - *cc*) and turn the switch to “ON” (ff) (FIG. 1).
9. Run the manometer for about 20 seconds. Observe the gauge and repeat this procedure until the pressure registered on the gauge stays constant.
10. To determine the counter pressure, wait approximately 5 minutes until the system has relaxed. Do one more discharge by turning the unit OFF; then ON again until it dispenses for **no more than 5 seconds**.
11. Wait approximately 5 more minutes to make sure the system does not lose pressure and remains constant.



12. To disconnect lubricator from manometer, follow ***pressure relief procedure*** , page 6.

    NOTE: In this application, you will be disconnecting adapter (B) from manometer instead of lubrication point.

NOTICE

Do NOT disconnect lubricator from adapter (B). Screwing anything into lubricator a second time will damage self-sealing threads.

13. If the counter pressure is 5 bar (72.5 psi) or higher, flush the lubrication point with a grease gun.

    If the counter pressure does not decrease you may need a different lubricant or size lubricator canister. Contact Graco Customer service for assistance.

Priming/Pre filling Fittings and Grease Lines

All accessories and grease lines must be primed/pre filled. Without this priming/pre filling, the lubricator would first have to fill the accessories with lubricant.

Example: A tube that is one meter long requires about 28 cm^3 of lubricant. It would take the lubricator with a 12 month setting and an EM-120 grease canister about 3 months to fill this 1 meter tube.

FIG. 2 illustrates one way to pre fill using a grease gun to dispense the grease.

FIG. 2

Circuit Board Settings

Function Display

Red and green LED's (Light Emitting Diodes) are on the circuit board and visible through the transparent cover. The following signals about operating conditions/malfunctions are displayed by these LED's for the user:

LED	Signal	Meaning
Green	Steady	System functions OK
Red	Steady for less than 30 seconds with motor running	Lubricator is discharging
Red	Steady signal for more than 30 seconds	Malfunction / error
Green and Red	Steady signal	Lubricator unit is empty. Change canister.

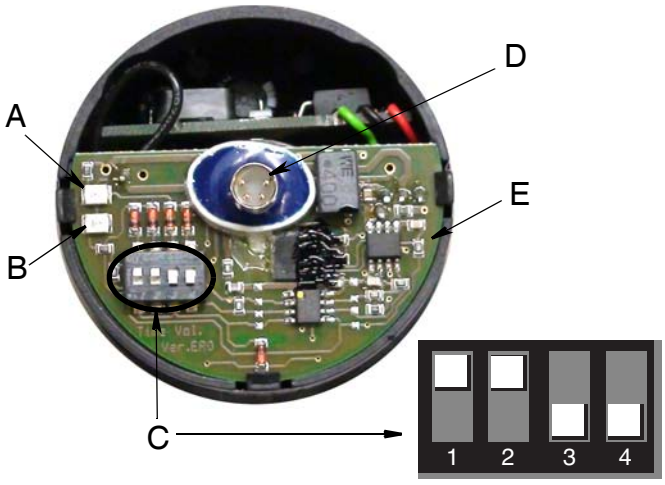


FIG. 3

A LED Red
B LED Green
C 4-way code switch
D Plug connection
E Circuit board

Setting Dip Switches

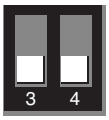
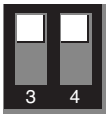
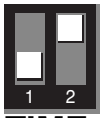
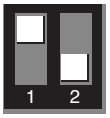
1. Unscrew and remove the cover of the drive unit.

2. Use a small screwdriver or your finger to move dip switches to the desired position. Refer to Table 1.

   - Dip switches 1and 2 marked "TIME" are used to set the discharge amount per impulse.
   - Dip switches 3 and 4 marked "VOL" are used to set the lubrication canister size. If the 4-way code switch does not correspond to the actual size of the lubrication canister, it will lead to a wrong signal and over or under lubrication.

TABLE 1: Dip Switch Settings / Discharge Amounts in CC / Impulse

- Amount of discharge in cc per impulse.
- White square indicates position of dip switch.

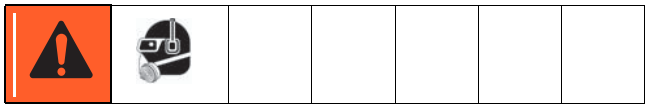
Lubrication Canister Size	EM-60	EM-120	EM-250
Dip Switch Position	**VOL**	 **VOL**	 **VOL**
ON  **TIME**	2.11	2.11	2.11
ON  **TIME**	1.06	1.06	1.06
ON **TIME**	0.53	0.53	0.53
ON **TIME**	0.26	0.26	0.26

NOTE:

- As soon as power is supplied, the controller will discharge the set amount **once**. Power must be applied at least until the discharge has taken place (approximately 2 minutes).
- In order to get **another** discharge cycle, the power must be **interrupted** for **at least 15 seconds,** and then supplied again.

Selecting Mounting Location

Installation Guidelines



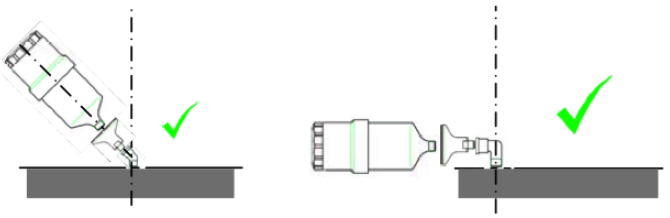
- Before installing the lubricator, the lubrication points and any extensions must be adequately pre-lubricated with the same lubricant contained in the lubricator. A 400 gram lubricant cartridge for grease guns is available from Graco. See Parts, page 22 for a complete list of available lubricant cartridges.
- Install one lubricator per lubrication point.
- When oil is used for lubrication, a non-return valve (oil throttle) must be installed. This will prevent oil leakage from the lubricator. An oil throttle, part number 124102 is available from Graco. See Parts, page 22.
- An oil-filled lubricator must be installed vertically (outlet down).
- For horizontal mounting a bracket clip must be used to hold the lubricator in place. A horizontal clip bracket part number 124086 is available from Graco. See Parts, page 22
- For vertical installations always use a support adapter part number 124105 is available from Graco. See Parts, page 22.
- The grease nozzle of the lubricator has a npt 1/4 inch male thread. If your application has a different thread you may need to use an adapter. See Parts, page 22 for a complete list of available adapters.
- Do not overtighten the plastic thread of the lubricator.
- For all metal to metal connections (i.e., extensions, reducers, etc.) make sure to use LOCTITE® 243* (semi-tight screw locking).

**Loctite® is a registered trademark of the Loctite Corporation.*

Direct Mounting Installation

Refer to FIG. 4 for examples of correct and incorrect direct mounting installations.

Correct



Incorrect

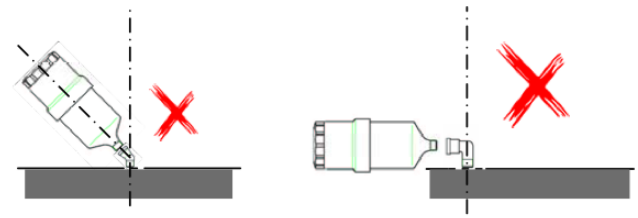


FIG. 4

Remote Mounting Installations

Refer to FIG. 5 - FIG. 7 for examples of correct remote mounting installations.

- Remote installations require a grease line. Graco recommends using a 5/16 inch flexible hose.
- Select a position for the lubricator that is easy to access and protected from high-pressure water jets, falling materials, corrosive chemicals and extreme temperatures.

Grease Lubrication with Tube

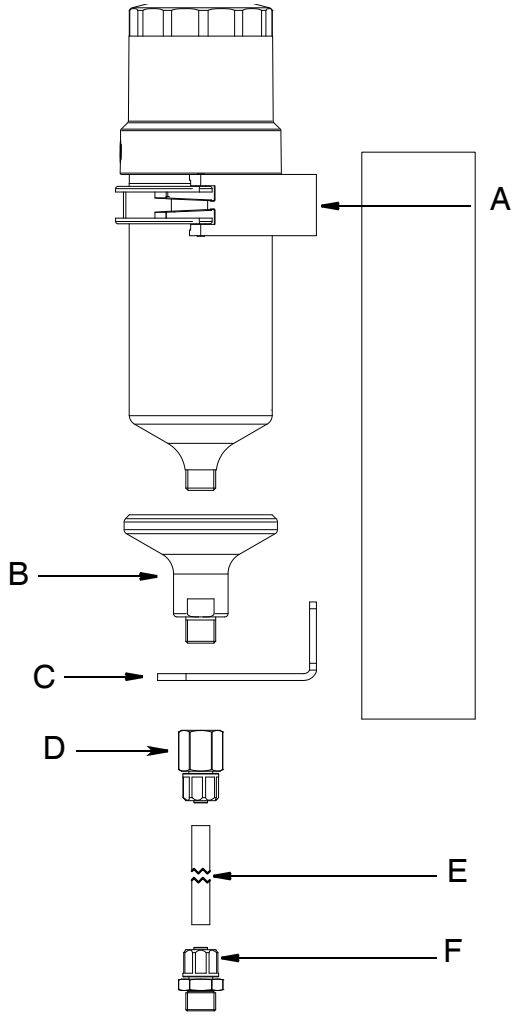
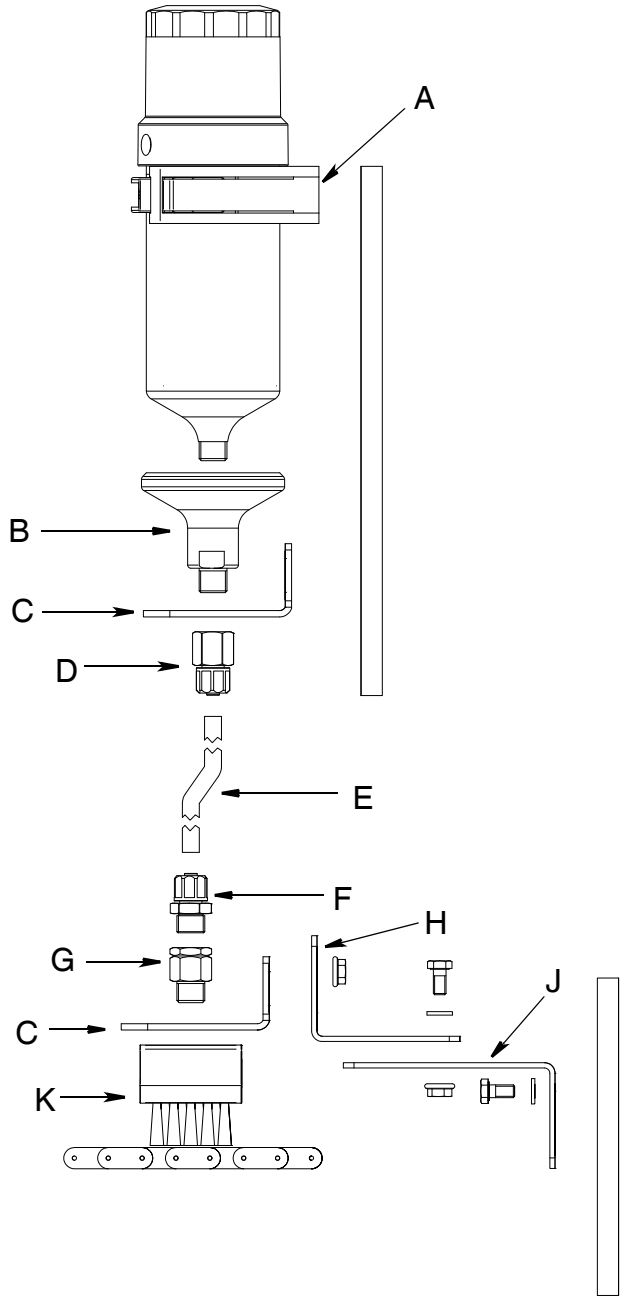


FIG. 5

A Clip, 124086
B Support adapter, 124105
C Bracket, 124087
D Tube connector◆ (User supplied)
E Nylon tube◆ (User supplied)
F Tube connections◆ (User supplied)

◆ *Must be at least 5/16 inch diameter tube.*

From-top-lubrication of a Chain with Oil



A Clip, 124086
B Support adapter, 124105
C Bracket, 124087
D Tube connector◆ (User supplied)
E Nylon tube◆ (User supplied)
F Tube connections◆ (User supplied)
G Oil throttle, 124102*
H L-Bracket, 124098
J Bulkhead mounting plate, 124099
K Oil brush, 1”x 1.5”, 124090

**The non-return valve (oil throttle (G) should always be placed at the lowest point of the application.*

◆ *Must be at least 5/16 inch diameter tube.*

FIG. 6

Lubrication of Elevated Chain with Oil

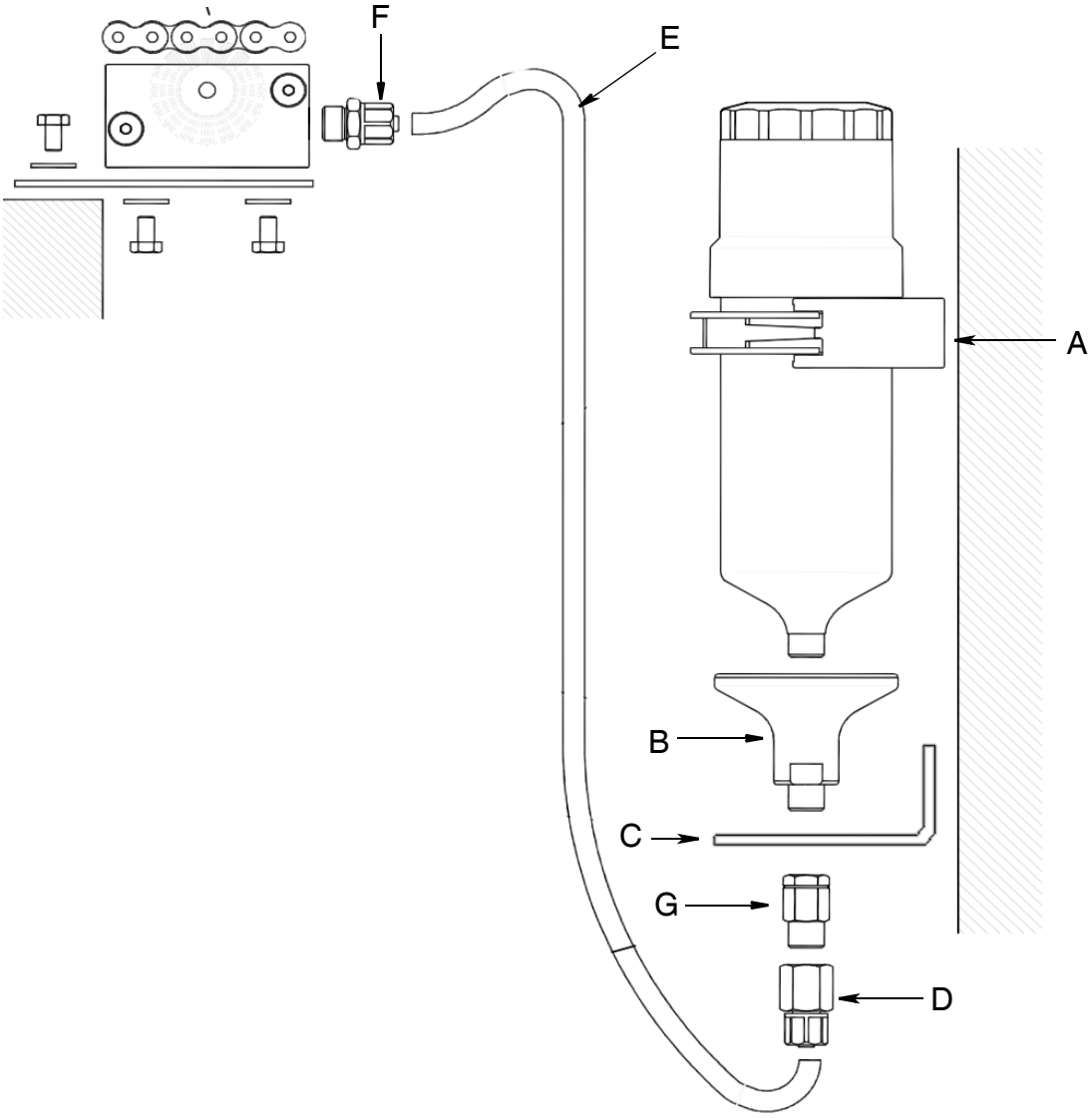


FIG. 7

A Clip, 124086
B Support adapter, 124105
C Bracket, 124087
D Tube connector◆ (User supplied)
E Nylon tube◆ (User supplied)
F Tube connections◆ (User supplied)
G Oil throttle, 124102*

**The non-return valve (oil throttle: G) should always be placed at the lowest point of the application.*

◆ *Must be at least 5/16 inch diameter tube.*

Installing Lubricator to Lubrication Point

1. Clean the lubrication point to remove any potential contaminants.
2. Verify the thread of the lubricator corresponds to the thread of the screw point.
3. Install reducers, extensions, grease line, etc. (if necessary).
4. Verify Dip Switches are correctly set. See Table 1, page 13.
5. Prime the grease line and all accessories with the same grease that is contained in the lubricator. (See Parts, page 22 for a complete list of available grease cartridges).
6. Remove the plug (A).

7. Install lubricator unit into adapter (B).

8. Screw lubricator to lubrication point, hand tight only.

NOTICE

To ensure optimal lubrication:

- Seal threads of all connecting parts with a suitable, standard sealant.
- Mount oil filled lubricators properly with the outlet pointing down.
- Never screw in the lubricator a second time or the self-sealing threads will be damaged.
- For remote mounting installations, make sure bracket does not squeeze the lubrication canister as this could block the piston inside the canister.

Operation

Before operation verify:

- The lubricator does not have any visible damage.
- The lubricator canister is filled with the requested grease or oil.
- For oil filled lubrication canisters, an oil throttle must be attached.
- The “VOL” switches 3 and 4 of the 4-way code switch match the correct size of the lubrication canister.
- The “TIME” switches 1 and 2 of the 4-way code switch in the drive unit match the desired discharge impulse.
- All components are properly assembled and screwed together hand tight.

To begin the discharge:

Plug power cable into lubricator (FIG. 8).

FIG. 8

During Operation:

- Carry out regular performance checks. Check for possible leakages and the status of the lubricator.
- Regularly monitor the fill-level of the transparent lubrication canister.

Changing the Lubrication Canister

When the red and green LED light up at the same time, the lubrication canister is empty and should be replaced.

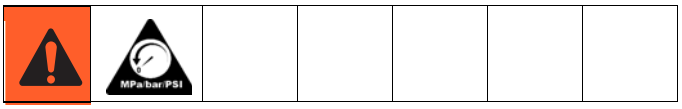
NOTICE

The drive unit and circuit board must always be protected from moisture to prevent damaging these components. Always change the lubrication canister in a dry place.

Removing Lubrication Canister

1. Unplug cable from lubricator (FIG. 9).

FIG. 9



2. To disconnect adapter from lubrication point, follow ***pressure relief procedure*** provided on page 6.
3. Unscrew and completely remove adapter (B) from the lubricator. Adapter will be reused.
4. Unscrew cover from drive unit.
5. Remove drive unit from the lubrication control.

Installing New Lubrication Canister

1. If a different size lubrication canister or discharge period is going to be used, change dip switches to reflect the new canister size and/or impulse change. See Table 1, page 13.
2. Place drive unit on top of new lubrication canister until the teeth of both pieces are locked.
3. Screw the cover of the drive unit onto the lubrication canister - hand tighten only.
4. Remove plug (A) from bottom of lubrication canister.

5. Install lubricator unit into adapter (B).
6. Screw lubricator into the lubrication point - hand tighten only. DO NOT screw it in a second time.

NOTICE

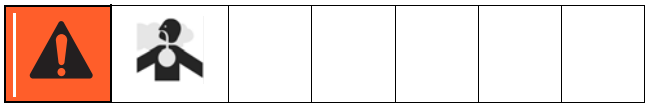
Never screw in the lubricator a second time or the self-sealing threads will be damaged.

7. For oil filled lubricators, make sure the lubricator is installed vertically (outlet pointing down).
8. Plug cable back into lubricator (FIG. 10).

FIG. 10

9. The control will wait for a pulse to start discharging.

Lubrication Canister Disposal

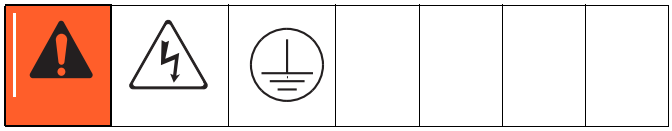


Dispose of hazardous fluid in approved containers, and according to applicable guidelines. Read the MSDS to know the specific hazards of the fluids you are using.

Storage

When lubricators are not immediately installed, they must be stored in a dry, dust free, sunlight protected room, indoors.

Troubleshooting



Malfunction	Possible Cause	Solution
Lubricator does not function	Wrong cable connection	Connect cable according to pin assignment (page 6). Check pin assignment.
	Break in cable	Check voltage at plug. Attach new cable.
	No power supply	Check power supply. Make sure there is sufficient power available for the number of lubricators used.
	Relay defect in machine	Change relays.
Lubricator signals “system functions OK” (green LED), although lubrication canister is empty	Setting of VOL switch different than attached lubrication canister	Replace lubrication canister with a full lubrication canister
	Partly filled lubrication canister was replaced by an almost empty lubrication canister	
Lubricator signals “system malfunctions” (red LED)	Clogged tube and/or connection parts	Clean tube and connecting parts, then shut off and restart lubricator.
	Counter pressure too high	
Lubricator discharges too fast	Wrong position of TIME switch	Replace lubrication canister with a full lubrication canister Set TIME dip switches (1 and 2) to correct setting.
Lubricator signals “end of discharge” (red and green LED) although the unit is not empty	Setting of VOL switch different than attached lubrication canister	Replace with full lubrication canister.
	Almost empty lubrication canister was replaced with a partially filled canister	
	Reset peg was not pushed down during assembly	Move drive unit a few teeth so reset peg is pushed down.
Lubricator does not discharge the correct amount	Dip switch setting was done incorrect	Replace lubrication canister with a full lubrication canister Set TIME dip switches (1 and 2) to correct setting.

Parts

Miscellaneous Accessories

Part No.	Description	Qty.
123951	MOTOR, EM-XC	1
124279	HARNESS, cable, power EM-XP/XC	1
124086	CLIP	1
124087	BRACKET, plastic	1
124089	BRUSH, pig hair, 1/4 fnpt - 3/4	1
124090	BRUSH, oil, 1 x 1.5	1
124091	BRUSH, oil, 1 x 2.4	1
124092	BRUSH, oil, 1 x 4	1
124093	BRUSH, link chain	1
124100	CLAMP, beam, 1”	1
124101	BRACKET, dual unit	1
124102	VALVE, check, oil throttle	
124109	KIT, accessory, purge	1
124113	APPLICATOR, chain, felt	1
124114	BRUSH, nylon, 1/8 mnpt x 5/8	1
124115	BRUSH, nylon, 1/8 mnpt x 2	1
124116	KIT, SA heavy green	1
124119	PADDLE, open gear lube	1

Mounting Brackets

Part No.	Description	Qty.
124094	BRACKET, mounting, small	1
124095	BRACKET, mounting, medium	1
124096	BRACKET, mounting, large	1
124097	BRACKET, mounting, flat	1
124098	BRACKET, mounting, L	1
124099	BRACKET, mounting, bulkhead	1

Fitting Adapter

Part No.	Description	Qty.
124105	ADAPTER, 1/4 fnpt x 1/4 mnpt	1
124106	ADAPTER, 1/4 fnpt x 1/8 mnpt	1

Pressure Relief Valve

Part No.	Description	Qty.
124107	VALVE, relief, 1/8 m, 5 lb	1
124108	VALVE, relief, 1/8 m, 1 lb	1

Replacement Cap

Part No.	Description	Qty.
124110	CAP, top	1
124111	CAP, full, 60-120 cc	1
124112	CAP, full, 250 cc	1

400 Gram Lubricant Cartridges

Part No.	Description	Qty.
124176	CARTRIDGE, lubricant, Lithium EP-2	1
124177	CARTRIDGE, lubricant, Construction	1
124178	CARTRIDGE, lubricant, Bearing	1
124179	CARTRIDGE, lubricant, Milling	1
124180	CARTRIDGE, lubricant, Food Grade H1	1
124181	CARTRIDGE, lubricant, Synthetic Industrial	1
124182	CARTRIDGE, lubricant, Ultra Spindle	1
124183	CARTRIDGE, lubricant, Lithium EP-1	1

Refill Kits

Part No.	Description	Qty.
24E582	KIT, refill, 60 cc, multi EP-2	1
24E583	KIT, refill, 60 cc, construction	1
24E584	KIT, refill, 60 cc, bearing	1
24E585	KIT, refill, 60 cc, mill	1
24E586	KIT, refill, 60 cc, food	1
24E587	KIT, refill, 60 cc, synthetic	1
24E588	KIT, refill, 60 cc, ultra	1
24E589	KIT, refill, 60 cc, multi EP-1	1
24E590	KIT, refill, 120 cc, multi EP-2	1
24E591	KIT, refill, 120 cc, construction	1
24E592	KIT, refill, 120 cc, bearing	1
24E593	KIT, refill, 120 cc, mill	1
24E594	KIT, refill, 120 cc, food	1
24E595	KIT, refill, 120 cc, synthetic	1
24E596	KIT, refill, 120 cc, ultra	1
24E597	KIT, refill, 120 cc, multi EP-1	1
24E598	KIT, refill, 250 cc, multi EP-2	1
24E599	KIT, refill, 250 cc, construction	1
24E600	KIT, refill, 250 cc, bearing	1
24E601	KIT, refill, 250 cc, mill	1
24E602	KIT, refill, 250 cc, food	1
24E603	KIT, refill, 250 cc, synthetic	1
24E604	KIT, refill, 250 cc, ultra	1
24E605	KIT, refill, 250 cc, multi EP-1	1

Technical Data

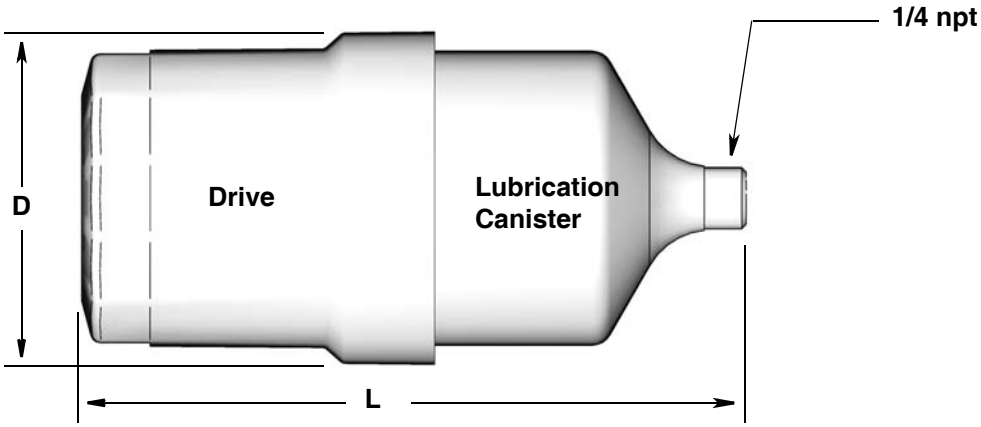
Cable Construction	Cable is drag chain qualified, approved for the smallest bending radius 60 mm.
Conductor cross-section dimensions	4 x 0.25 mm^2
Power Supply	15 - 25 VDC (max 30 VDC, 5% residual ripple) for the duration of the actual lubricant discharge.
Total current consumption	0.2 A (current at discharge can be up to 1.2 A).
Maximum output load	Pin 2 and 4 cannot exceed 400mA each
Temperature range	-10°C to +50 °C (+14°F to +122°F)
Maximum output pressure	5 bar (75 psi)
Storage	
Conditions	Dry, dust free
Temperature	+20°C ± 5°C (+68°F ± 9°F)
Air born Noise Emission	<70 dB(A)†

Loctite® is a registered trademark of the Loctite Corporation.

† Emission sound pressure level of the lubrication system measured at distance of 1 m / height 1.6 m.

Weights and Measurements

Type	Volume		Diameter (D)		Length (L)		Weight (empty)	
	cm^3	fl. oz	mm	in.	mm	in.	kg	lbs
EM-60	60	2.03	71	2.8	142	5.60	0.310	0.68
EM-120	120	4.06	71	2.8	165	6.50	0.320	0.7
EM-250	250	8.45	71	2.8	215	8.46	0.360	0.79



Notes

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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Original instructions. This manual contains English. MM 3A0416
Patent information: www.graco.com

Graco Headquarters: Minneapolis
International Offices: Belgium, China, Japan, Korea

GRACO INC. P.O. BOX 1441 MINNEAPOLIS, MN 55440-1441

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